

# SMW Workflow/BPM Integration

Joel Natividad  
TCG  
Sept 19, 2010  
SMWCon Fall 2010  
Amsterdam

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[CLICK HERE.](#)

**ADVENTURES IN**

# SMW Workflow/BPM Integration

*AND WHY THE  
SMW COMMUNITY SHOULD CARE*

Joel Natividad

TCG

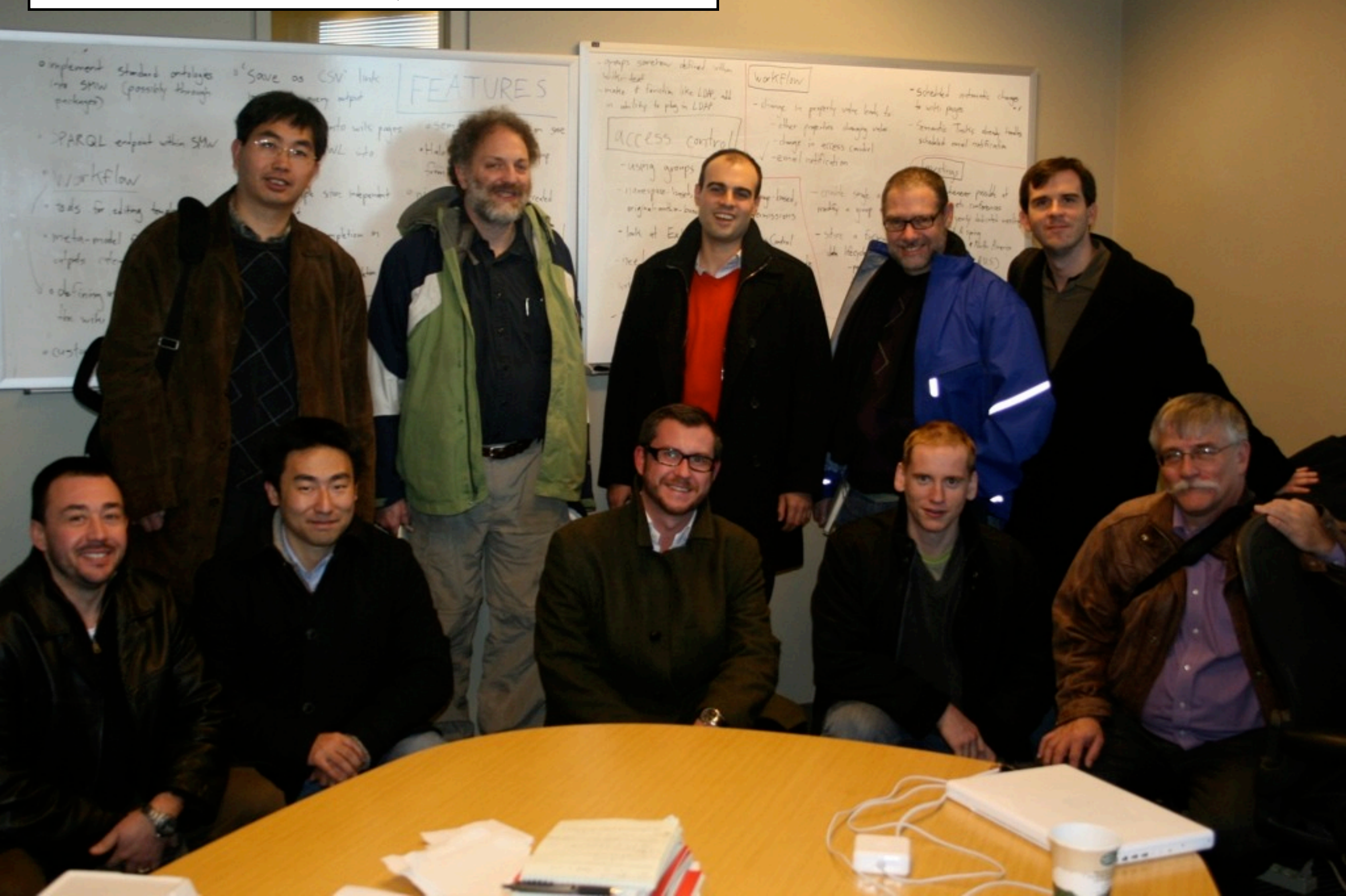
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# 1<sup>st</sup> SMW User's Meeting

Nov 22-23, 2008





???



groups somehow defined within  
other tool  
make it function like LDAP, add  
in ability to plug in LDAP

## Access Control

- using groups

- namespace-based, original author-based

- lack of Ext

- need

## Workflow

- change in property value leads to
  - other properties changing value
  - change in access control
  - email notification

- Scheduled automatic check to write pages

- Semantic Table, already scheduled email notification

## Security

- create single, probably a group

- store a function in the lifecycle

however problem is  
in conferences  
you're looking at  
it spring  
& then there  
(U.S.)

# SMW "Tech Day" Meeting

Nov 23, 2008

## FEATURES

- implement standard ontologies into SMW (possibly through packages)
- SPARQL endpoint within SMW
- Workflow
  - tools for editing templates
  - meta-model for data that outputs categories, forms, templates
  - defining user groups through the wiki (semantically)
  - customizable start pages for users
- 'Save as CSV' link in #ask query output
- import XML into wiki pages
- import RDF/OWL into wiki pages
- data in triple store independent of wiki text
- conditional autocompletion in forms
- categories as autocompletion values in SF
- query results as autocompletion/dropdown values in SF
- WISIWIG support within SF
- semantic refresh on save
- Halo ontology browser popup from forms
- nicer-looking forms created by 'createForm'

## access control

- SMW using triple store as a data source
- rules in SMW (derive from SWRL?)
- Halo annotation within a WISIWIG editor

- groups somehow defined within wiki-text
- make it function like LDAP, add in ability to plug in LDAP

## access control

### using groups

- namespace-based, category-based, page-based, original-author-based, query-based permissions

- look at Extension GroupBasedAccessControl

- need "Can be read by group", "Can be written by group" properties?

- SMW queries must respect this access control

- also, 'recent changes' page

## Workflow

- change in property value leads to:
  - other properties changing value
  - change in access control
  - ✓ - email notification

- Scheduled automatic changes to wiki pages
- Semantic Tasks already handles scheduled email notification

## meetings

- meet whenever possible at semantic web conferences
- twice-yearly dedicated meeting
  - fall & spring
  - Europe & North America (Germany & US)
- store a formalization of data lifecycle
  - perhaps implement this through an external tool like Yahoo! Pipes



# FEATURES

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- SMW queries must respect this access control
- also, 'recent changes' page

## Workflow

- change in property value leads to:
  - other properties changing value
  - change in access control
  - ✓ - email notification

- enable single action to modify a group of pages
- store a formalization of data lifecycle
  - perhaps implement this through an external tool like Yahoo! Pipes

- Scheduled automatic changes to wiki pages
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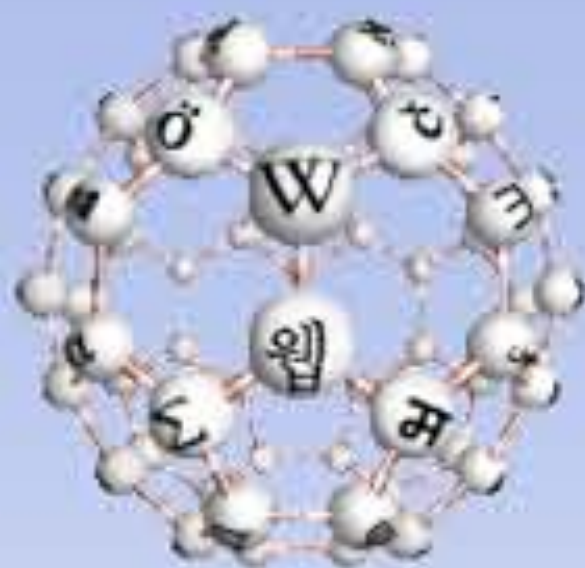
1 year, 9 months, 26 days later...

The community has done well!



# 1 year, 9 months, 26 days later...

- ☒ SPARQL endpoint
- ☒ save as CSV
- ☒ import/export RDF
- ☒ triplestore connector
- ☒ access control
- ☒ several major releases
- ☒ and much, much more!!!!



## history

This page gives an overview of extensions that have been specifically developed for **mediawiki** based on its semantic core functionality. An alternative list is given by the [mediawiki](#). for all extensions, the respective authors should be contacted for support.

- 1 Adding and modifying data
  - 1.1 Semantic Forms
  - 1.2 SMW OntologyEditor
  - 1.3 Halo
  - 1.4 Rule Knowledge
  - 1.5 Collaboration extension
  - 1.6 WYSIWYG
  - 1.7 MetaVidWiki
  - 1.8 Semantic Forms Inputs
  - 1.9 Semantic Signup
  - 1.10 FolkTagCloud
- 2 Searching and browsing
  - 2.1 Enhanced Retrieval
  - 2.2 Semantic Drilldown
  - 2.3 Semantic Gardening
  - 2.4 SemanticQueryFormTool
  - 2.5 Semantic Treeview



3.2 Semantic Maps

3.3 Semantic Compound Queries

3.4 Semantic graph extensions

4 Storing data

4.1 Semantic History

4.2 Semantic Internal Objects

4.3 Triple Store Connector

5 Protecting data

5.1 Halo Access Control

6 Awareness and workflow

6.1 Semantic Notifications

6.2 Semantic Tasks

7 Importing data

7.1 Data Import

7.2 Data Transfer

7.3 External Data

7.4 Freebase

7.5 Rich Media

8 Exporting data

8.1 RDFa

9 Obsolete or discontinued extensions

9.1 Question API

9.2 Semantic Calendar

9.3 Semantic Gallery

9.4 Semantic Google Maps

9.5 Semantic Layers

hoe zit het met  
Workflow?



# Why Workflow?

- Business Processes = Workflow
- Knowledge Formulation = Workflow
- Natural extension for SMW (forms)
- Accelerate corporate adoption
- Facilitates contributions
- Clients\$ require Workflow



- Clients require Workflow



# Client's Profile

- Major integrated healthcare provider in the US
- Recognized innovator in healthcare IT
- Creating a Next Generation Knowledge Asset Management System
- Currently has a hodge-podge of legacy systems “tied together with bailing wire”
- Preparing for the coming age of personalized medicine

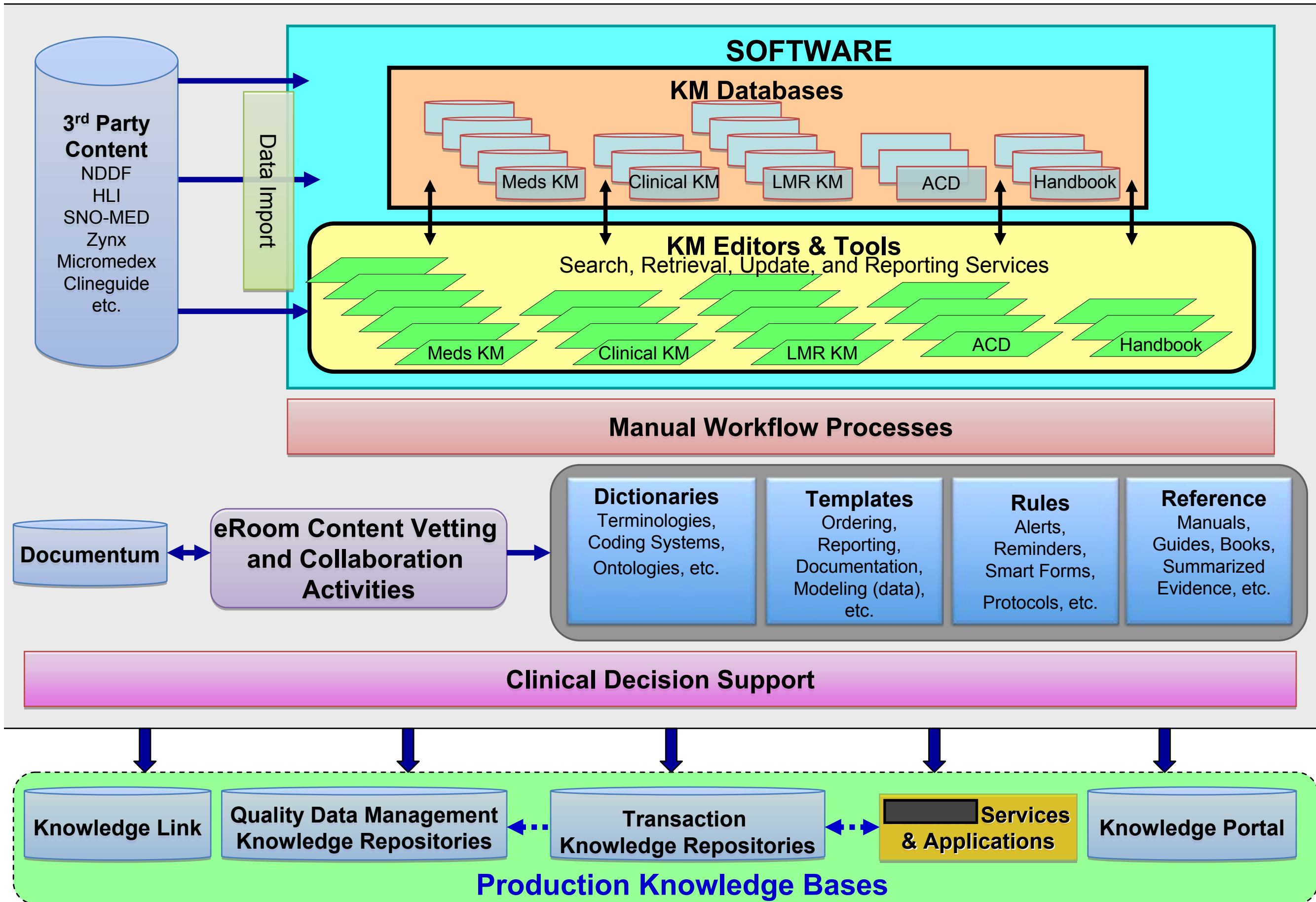
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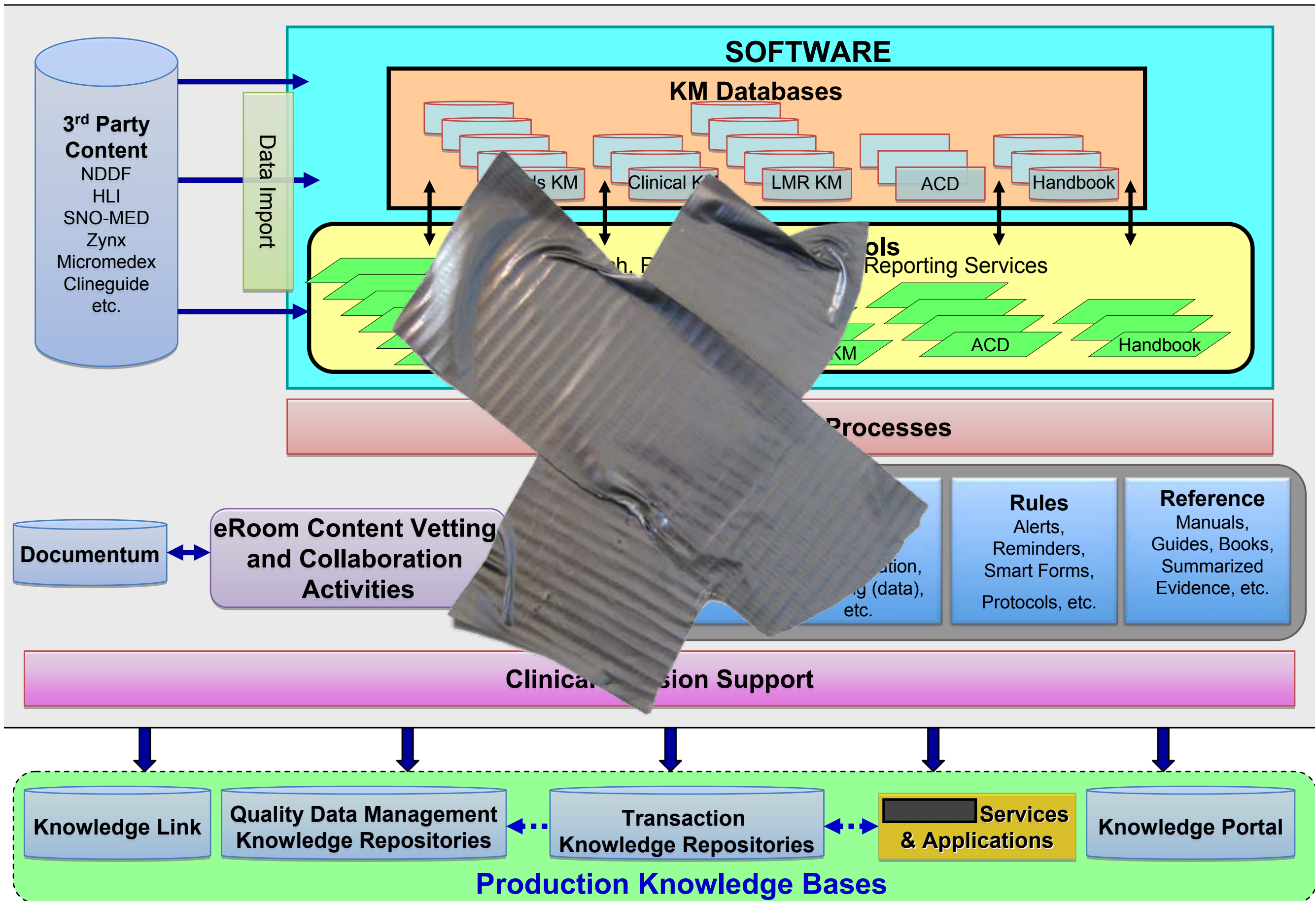
**MOST WIRED**



# Current Knowledge Management Infrastructure

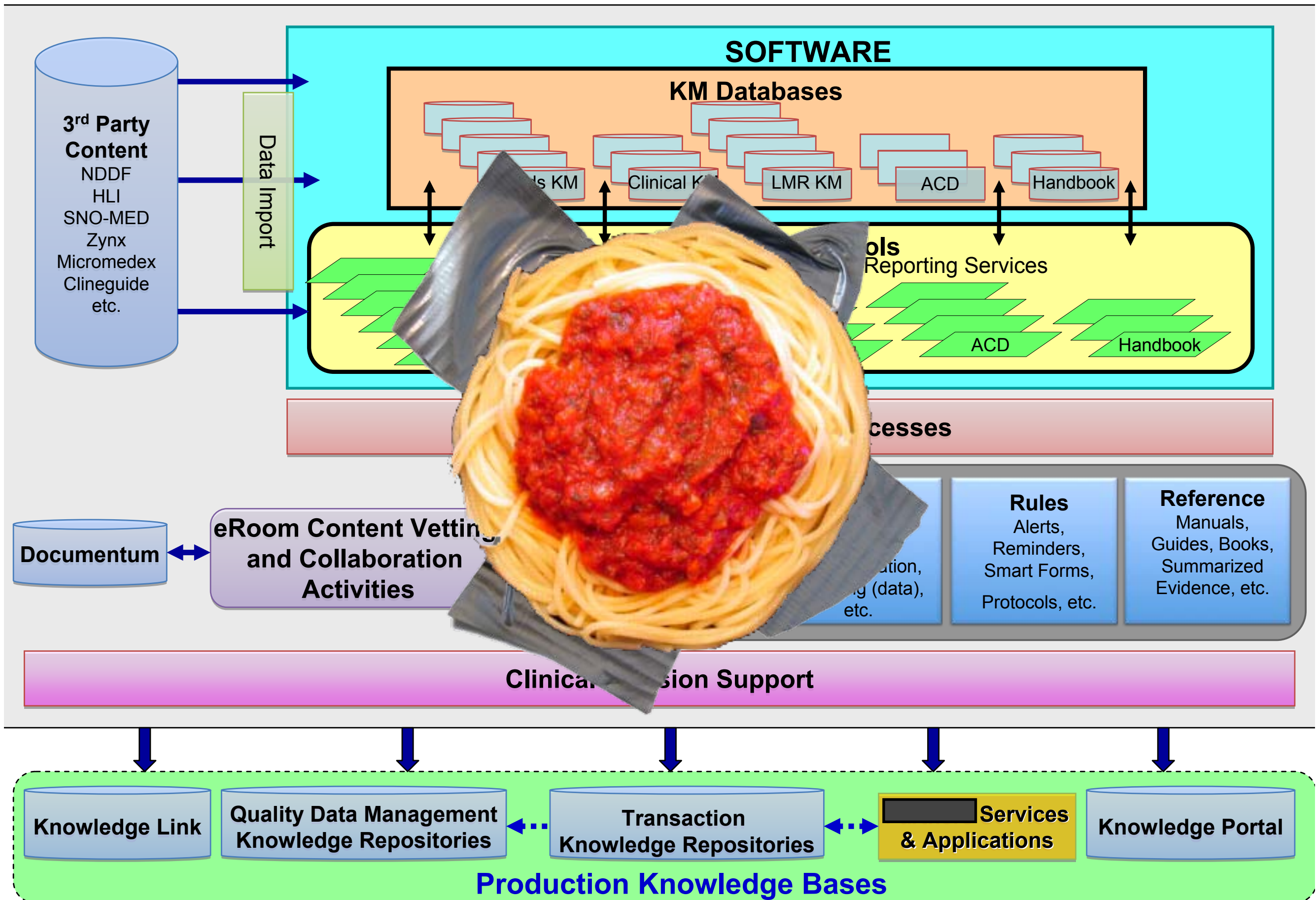


# Current Knowledge Management Infrastructure





# Current Knowledge Management Infrastructure











If I had some duct tape,  
I could fix that...



# Future: Knowledge Asset Management System

- Clinical Decision Support System+
- Clinical Knowledge Assets (clinical decision support rules, medication databases, etc.)
- 2009 - ran a PoC using traditional techniques
- doing a second PoC using the same use cases with semantic technologies (starting Nov 2010)
- based on results of bake-off, go forward with a reference system

# Future: Knowledge Asset Management System

- Clinical Decision Support System
- Clinical Decision Support System (c.)
- 2009 - Techniques
- doing cases (Nov 2010)
- based on results of take-on, go forward with a reference system



So what are these  
Knowledge Assets?



## **Clinical Guidelines for the Treatment of Type 2 Diabetes in the Non-Pregnant Adult February 2009**

This document contains the following:

- Criteria for Diagnosis
- Treatment Goals
- Recommended Frequency of Diabetes Care Components
- Glycemia Management for the Non-Pregnant Adult, Step 1
- Glycemia Management for the Non-Pregnant Adult, Step 2
- Glycemia Management for the Non-Pregnant Adult, Step 3
- LDL Management for the Non-Pregnant Adult
- Hypertension Management for the Non-Pregnant Adult

Therapeutic lifestyle changes, self-management education and ongoing monitoring by the patient and provider are important components of diabetes care.

Healthcare providers should also be familiar with prescribing information for the medications identified in these guidelines.

In addition to the statements above, important information pertaining to specific guidelines can be found on each page.

*Disclaimer: These guidelines were established after careful review of current evidence and sound clinical practice and are endorsed by the Partners Diabetes Council. The recommendations serve to assist clinicians in the treatment of diabetes and do not seek to supercede the judgment of healthcare providers. Modifications may be appropriate in a given setting; particular relevant influences may include a given individual's abilities, co-morbidities, overall health and anticipated lifespan. The responsibility for individual patient care decisions rests solely with healthcare providers.*

### **Diagnosing Diabetes or Pre-Diabetes in the Non-Pregnant Adult**

#### **Diagnostic Criteria for Diabetes**

- Random glucose  $\geq 200$  mg/dl with polyurea, polydipsia or weight loss, **or**
- Fasting glucose  $\geq 126$  mg/dl in the absence of intervening illness or steroid use\*, **or**
- Plasma glucose  $\geq 200$  mg/dl at 2 hours on an oral glucose tolerance test (OGTT<sub>†</sub>) performed with 75 gm glucose administered

\*Requires confirmation on a separate day

† Routine performance of OGTT is **not** recommended

### **Diagnostic Criteria for Pre-Diabetes**

- Fasting blood glucose of 100-125 mg/dl (Impaired Fasting Glucose – IFG), **or**
- Blood glucose of 140-199 mg/dl (Impaired Glucose Tolerance – IGT) at 2 hours on OGTT\* performed with 75 gm oral glucose administered

As noted above, routine or common performance of OGTT is **not** recommended

First-line treatment of pre-diabetes is lifestyle modification (e.g. dietary modification and performance of regular exercise). Some clinicians recommend the use of metformin along with lifestyle modification particularly among individuals under age 60, with an elevated BMI or with additional risk-related concerns (e.g. metabolic syndrome or vascular disease).

### **Major Goal in the Treatment of Diabetes in the Non-Pregnant Adult: Control the ABCs (A1c, Blood Pressure, Cholesterol)**

#### **A. A1c <7%**

While recent studies demonstrate conflicting outcomes and some data remain preliminary, we recommend an HbA1c treatment goal of < 7% under most circumstances. Clinicians and patients should individualize treatment targets which balance risk and benefit when determining glycemic targets.

#### **B. Blood pressure $\leq 129/79$ mmHg**

Alteration in blood pressure goals may be appropriate based on relative systolic and diastolic blood pressure, age, orthostatic blood pressure and adverse effects related to medications.

#### **C. Cholesterol (Lipids)**

#### **Primary Goals**

- LDL <100 mg/dl in patients >40 years or in adults 30-40 years with additional risk factors for vascular disease
- LDL <70 mg/dl in patients with co-existing, or extensive risk factors for, vascular disease (when reaching that goal is practical)

#### **Secondary Goals**

- HDL >40 mg/dl  
Niacin can effectively elevate HDL but its use may not be appropriate in a given setting as niacin can worsen glycemic control
- Triglycerides <150 mg/dl  
When elevated (e.g. >200 mg/dl), triglycerides will often decline in parallel with improvement in glycemic control, limitation of dietary carbohydrates and/or alcohol ingestion. Pharmacologic therapy (a



### Recommended Frequency of Diabetes Care Components

Action	Frequency
A1c	Every 6 months if controlled (A1c <7%) and therapy/clinical circumstances remain unchanged Every 3-6 months if uncontrolled (A1c ≥7%) and/or evaluating change in treatment
Blood pressure	At every visit
Lipid profile	Annually Repeat lipid profile 3 months after a change in therapy
Weight / BMI	At every visit
Review blood glucose logs or meter printout	At every diabetes care visit
Urine microalbumin / creat	Annually*
Serum creatinine and eGFR	Annually
Dilated eye exam by eye care professional	1-2 years if most recent exam normal Increased frequency beyond yearly in setting of retinopathy as determined by eye care professional <i>(BC/BS pay-for-performance requirements call for annual dilated eye exam)</i>
Foot exam	Comprehensive foot exam annually. If at a particular high-risk (i.e. neuropathy or PVD) inspect at every visit
Smoking cessation education	At every diabetes visit (unless non-use is assured)
Influenza vaccine	Annually
Pneumococcal vaccine	Once before age 65 and once after age 65 with at least a five-year interval between doses
Aspirin therapy (81 mg/day)	For all patients >40 years and those 30-40 years with additional risk factors for vascular disease
Review medication management	At every diabetes care visit



Psychosocial assessment: Emphasis on assessment of unsuspected depression	As needed. Depression may be present in upwards of 20% of the diabetes population.
Assess self-management skills: testing and insulin management; lifestyle habits; and overall diabetes knowledge	At least annually; more frequently when appropriate

\* Some clinicians measure the urine microalbumin / creat on an annual basis (even after elevation is demonstrated) to titrate ACE/ARB dosing.

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## Knowledge Assets

- Clinical Decision Support Rules
- Electronic Health Records
- Medication Databases
- Medical Vocabularies  
(SNOMED-CT, RxNorm, UMLS, etc.)
- External Datasources  
(NDDE, Micromedex, Zynx, etc.)

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# EXISTING Knowledge Management System

- Keyword-based Search
- No easy way to annotate/collaborate
- File-centric, technology-centric
- Non-tech SMEs cannot participate effectively









Search this wiki

Go

Search



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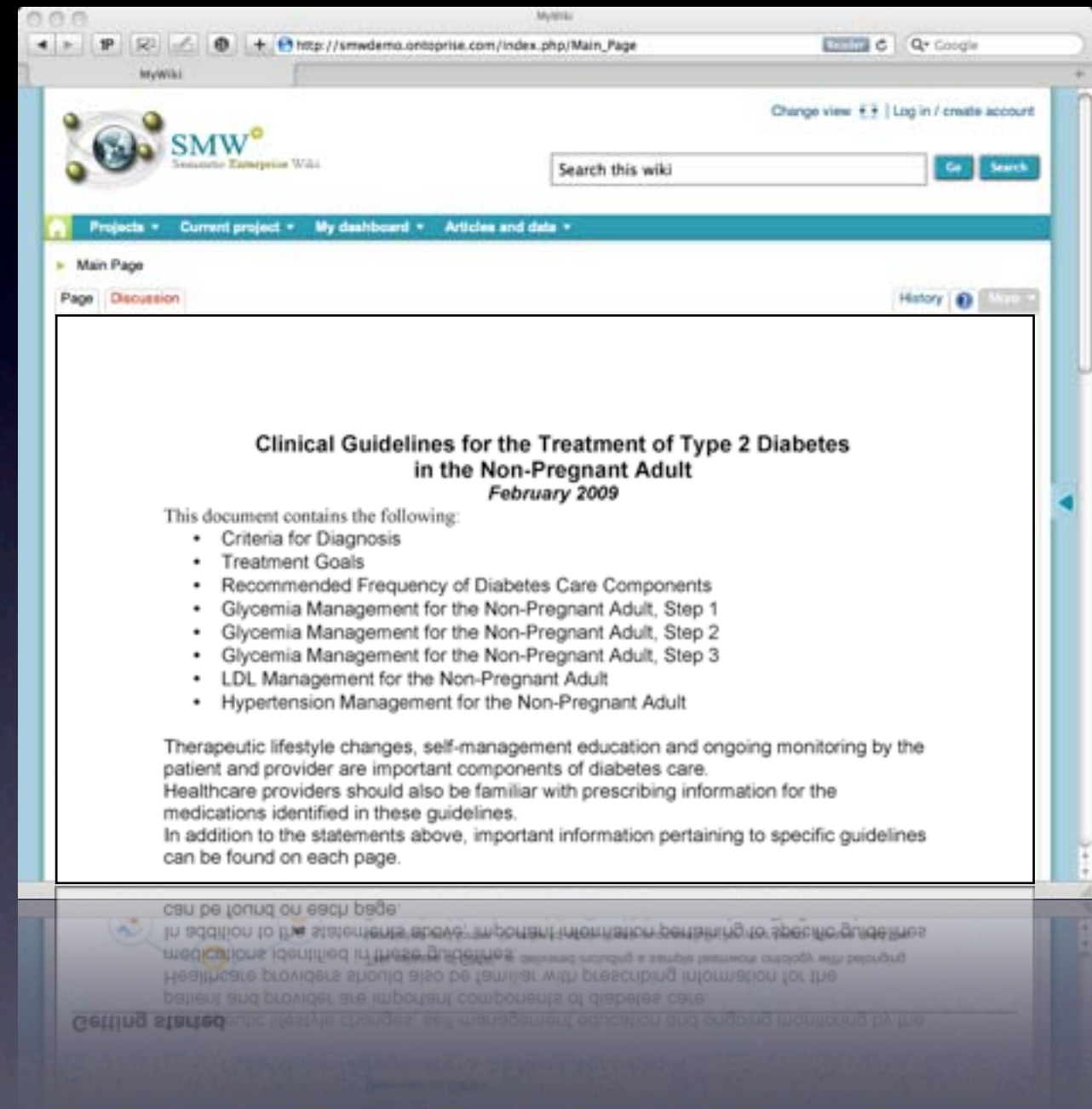
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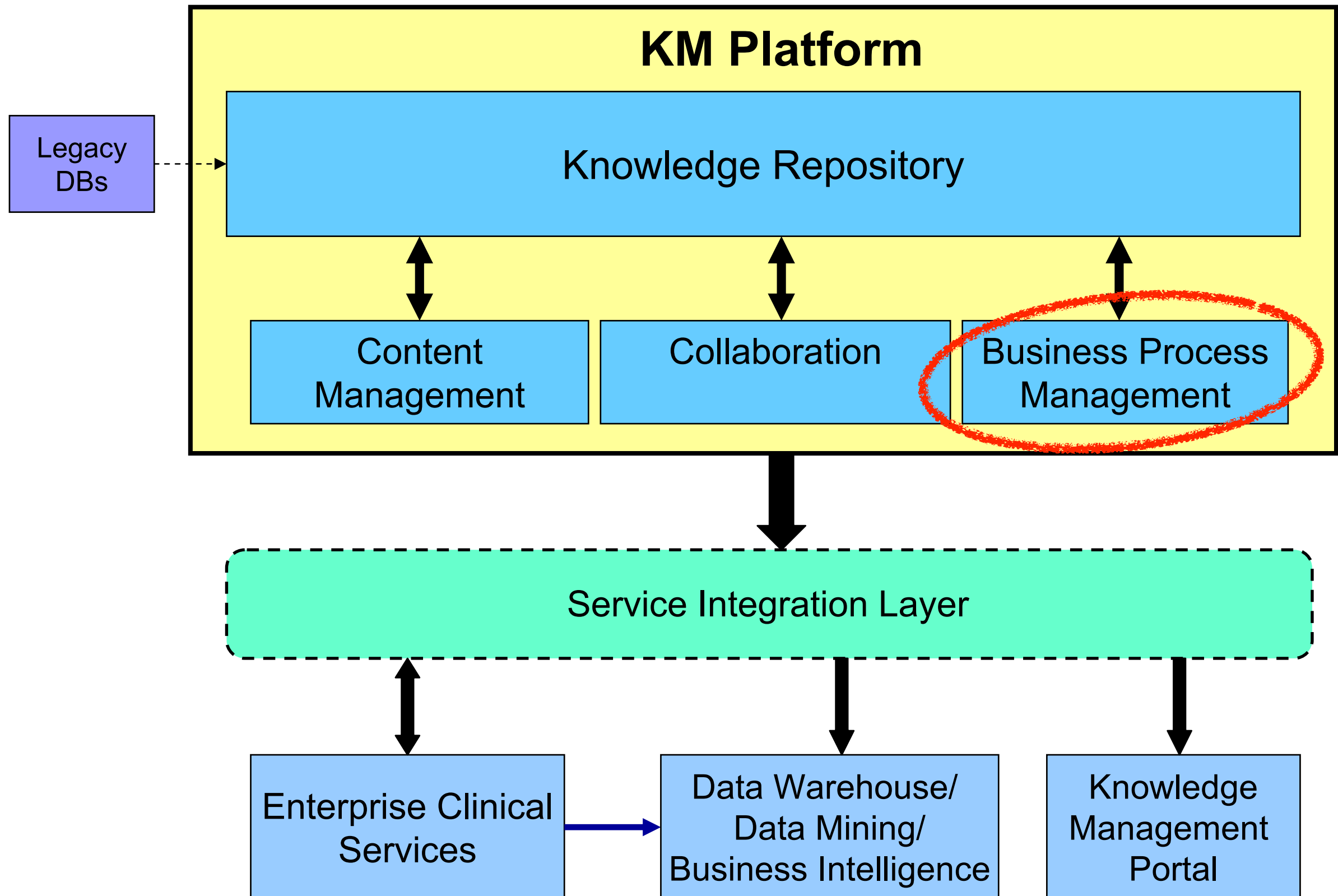
# FUTURE Knowledge Management Platform

- Inline queries
- Visualizations
- Semantic Search
- Semantic Social Knowledgebench
- Knowledge-centric, **NOT** file-centric
- Non-tech SMEs **CAN** participate & contribute effectively
- **INFERENCE!!! (Ontobroker)**
  - Synonyms
  - Validation
  - Auto-completion
  - Recommendation (“see also...”)
  - Dynamic Overview Pages
- **LINKED DATA**
- **AND SO MUCH MORE...**

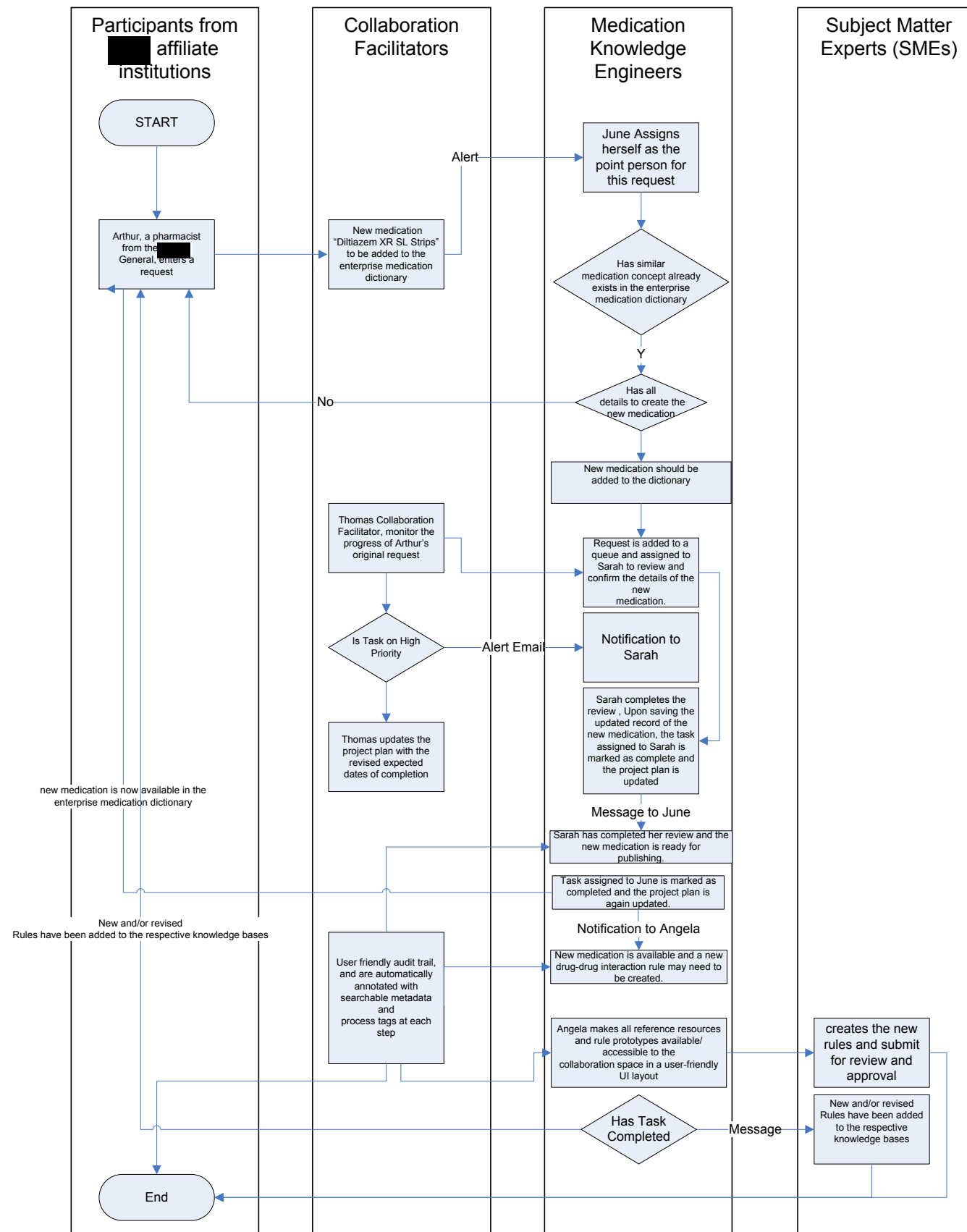




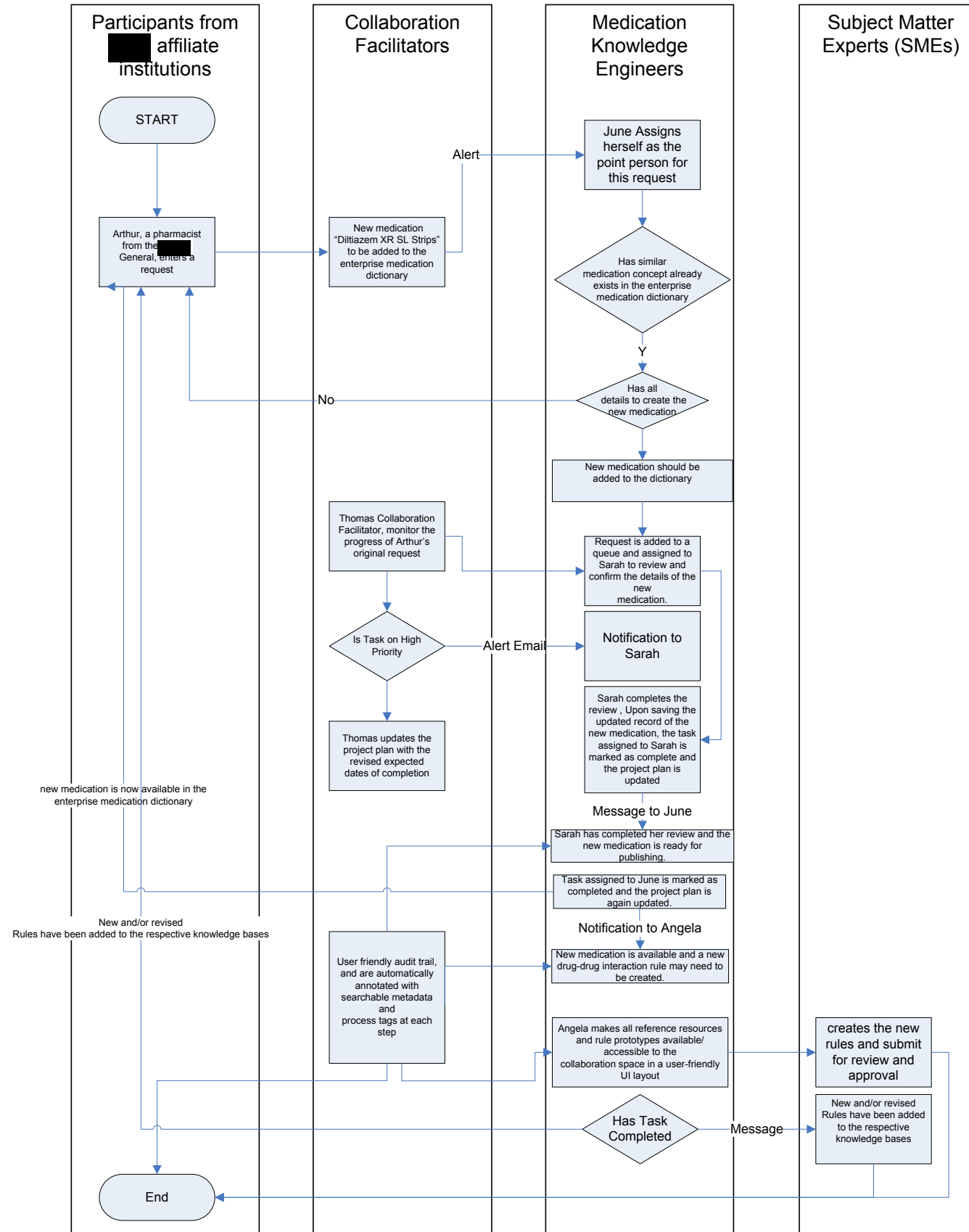
# Future State: KM Platform and Components



# Business Process Management



# Workflow





## Participants from [REDACTED] affiliate institutions

START

Arthur, a pharmacist  
from the [REDACTED]  
General, enters a  
request

## Collaboration Facilitators

New medication  
“Diltiazem XR SL Strips”  
to be added to the  
enterprise medication  
dictionary

Alert

No

Thomas Collaboration  
Facilitator, monitor the  
progress of Arthur’s  
original request

Is Task on High

## Medication Knowledge Engineers

June Assigns  
herself as the  
point person for  
this request

Has similar  
medication concept already  
exists in the enterprise  
medication dictionary

Y

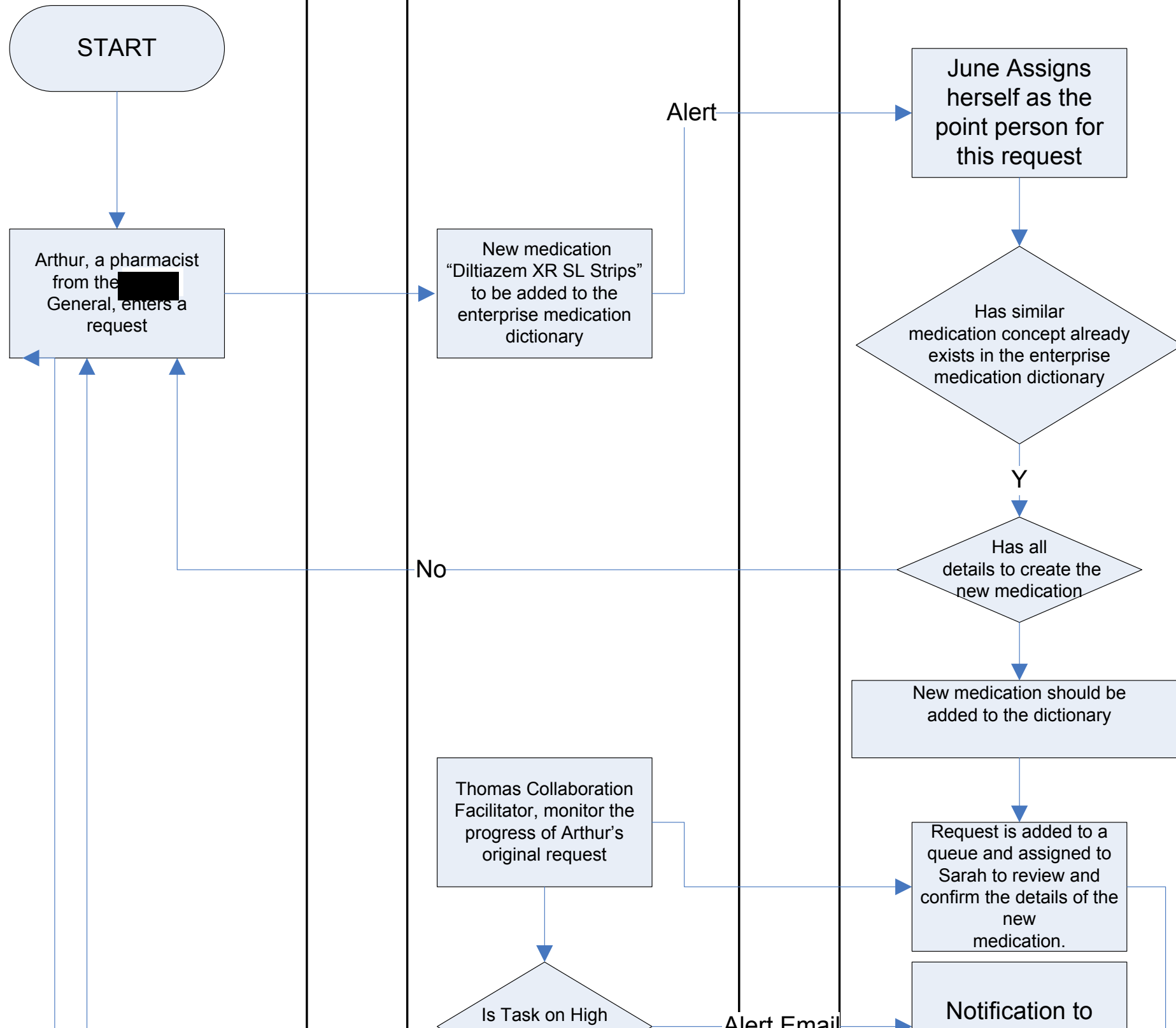
Has all  
details to create the  
new medication

New medication should be  
added to the dictionary

Request is added to a  
queue and assigned to  
Sarah to review and  
confirm the details of the  
new  
medication.

Notification to

## Subject Matter Experts (SMEs)



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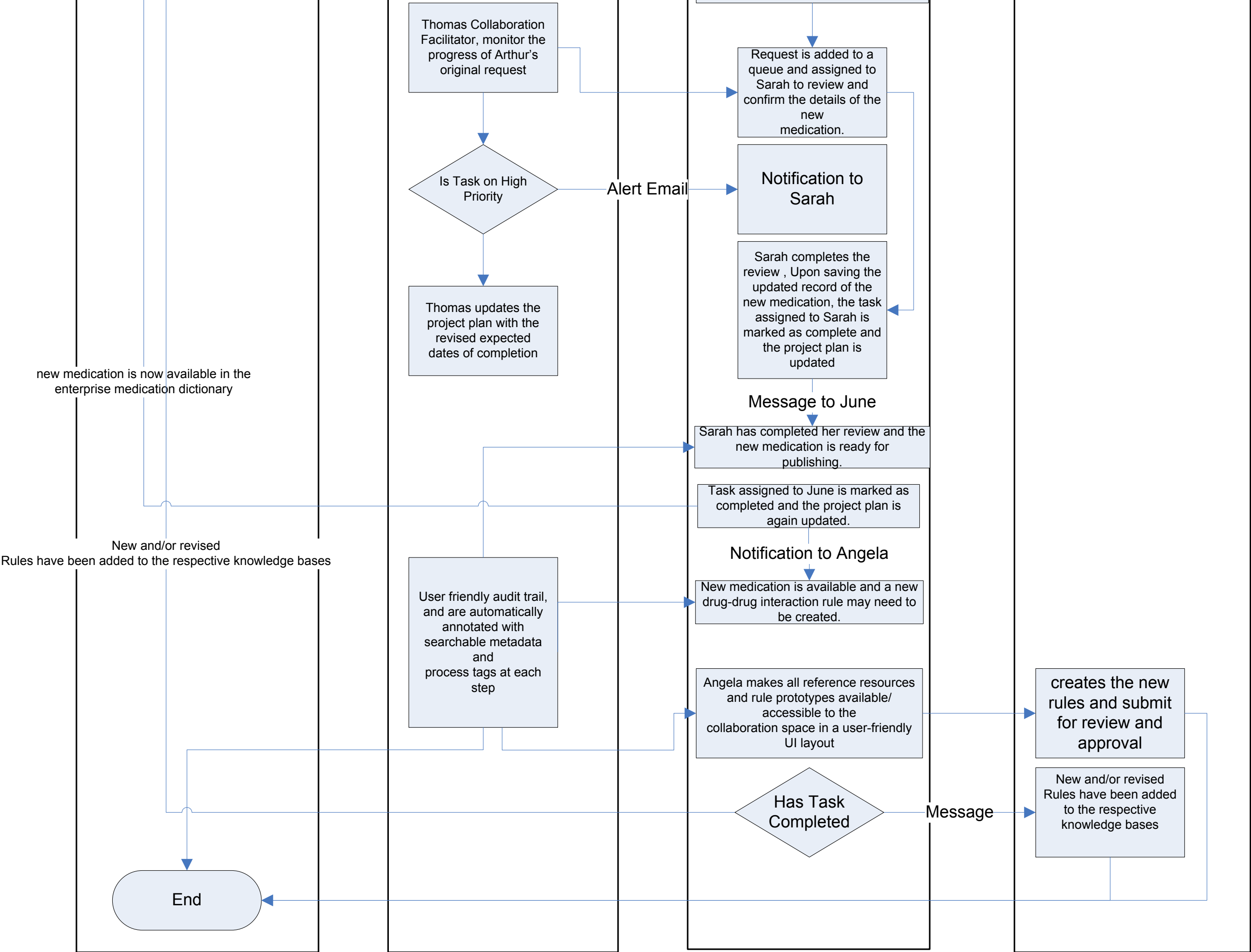
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# Semantic Web

## Navigation

[Main Page](#)
[Tools](#)
[Ontologies](#)
[People](#)
[Events](#)

## services

[Editing help](#)
[Browse wiki](#)
[OWL/RDF feeds](#)
[Recent changes](#)

## Toolbox

[What links here](#)
[Related changes](#)
[Upload file](#)
[Special pages](#)
[Printable version](#)
[Permanent link](#)
[Browse properties](#)

Page [Discussion](#)
[Read](#)
[Edit](#)
[View history](#)




## SMW+



### What is SMW+?

SMW+ is a semantic enterprise wiki that is distributed by [ontoprise GmbH](#), Karlsruhe, Germany. SMW+ is well suited for organisations or teams dealing with complex and informal workflows. SMW+ offers a rich feature set to create, share, publish and re-use knowledge contained in wiki contents.

Ontoprise develops extensions to MediaWiki and carefully picks other useful extensions and, if having passed our rigorous quality assurance procedure, casts them into SMW+. Apart from a team work ontology, SMW+ includes [Semantic MediaWiki](#), [Halo Extension](#), Semantic Forms, a WYSIWYG editor and many more useful extensions.

### SMW+

[wiki.ontoprise.com](#)

Status: [stable](#)

Last release: [1.5.1 \(August 9, 2010\)](#)

License: [GPL](#)

Affiliation: [ontoprise](#)

### Web resources

[Download](#)
[Source code](#)
[Documentation](#)


## Create and edit

- Create visually appealing wiki pages in the rich text editor and embed documents and rich media in your wiki
- Enter and tag data like sales figures, milestone dates and customer comments freehand or using forms
- Annotate contents with semantic tags leveraging organisation and retrieval of knowledge stored in your wiki
- Create logical rules with a graphical rules editor for stating complex interrelations

[Learn more...](#)



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Status:	stable
Last release:	1.5.0
License:	GPL
Affiliation:	ontoprise
Web resources	
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# Workflow Alternatives

- Use existing extensions
- Use the project management system
- Build a workflow system inside SMW
- Build a workflow ontology in OntoBroker
- Hook up to an existing, off-the-shelf workflow system (JBPM, Drools, Yahoo Pipes, Galaxy, etc.)
- Other alternatives?

# Workflow Alternatives

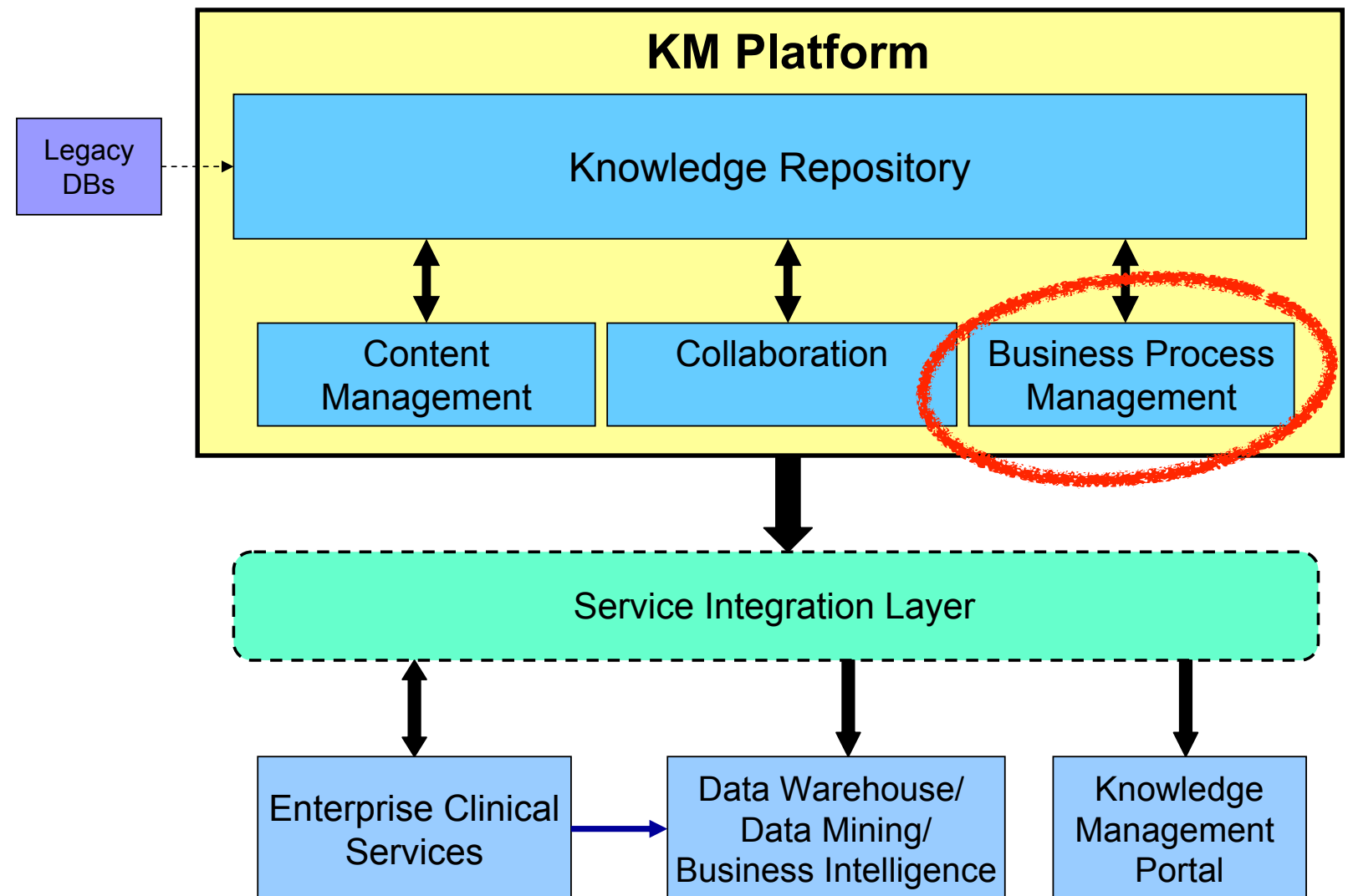
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- Hook up to an existing, off-the-shelf workflow system (JBPM, Drools, Yahoo Pipes, Galaxy, etc.)
- Other alternatives? ???

*which one?*





## Future State: KM Platform and Components



Let's continue the  
~~interrogation~~ conversation



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[joel.at.natividads.com](http://joel.at.natividads.com)